

Studies on People Employed in High Risk Workplace: Between Genetic Polymorphism for Tumor Necrosis Factor (TNF-A) and Blood Pressure

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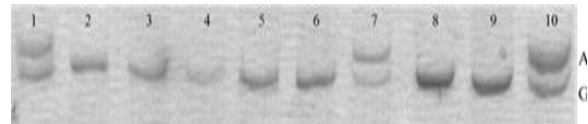
INTRODUCTION

One of the biggest problems -that workers can have are harmful conditions of the working environment such as outdoor work, chemical substances and noise which can lead to disorders of the immune system and thus with workers' health. The immune system is regulated by a complex cytokines' network. Cytokines are glycoproteins produced by various types of immune cells (lymphocytes, monocytes, macrophages, etc). The Tumor necrosis factor α (TNF- α) is cytokine with significant role in inflammation, which is very important for innate and acquired immunity and apoptosis [1]. It has been proved that obesity, smoking and aging increase TNF- α secretion while physically activity and dietary supplements reduce its production [2]. Genetic variations, primarily polymorphisms of one nucleotide, affect the level of TNF- α and according to literature data, they might be related to a higher risk for developing different diseases. The most studied polymorphism in literature is in the promoter region of the TNFA gene at position 308 (G308A), whereby the existence of the A allele is often linked with increased TNF- α production [3]. The aim of this study is to determine the connection between TNFA-308 genotypes and health conditions of people employed in high risk workplace.

EXPERIMENTAL SETUP

The research encompasses 111 workers engaged in high risk workplaces for more than eight years (aircraft maintenance staff). Data on length of service as well as habits (such as smoking and alcohol consumption) were obtained from an interview. Body

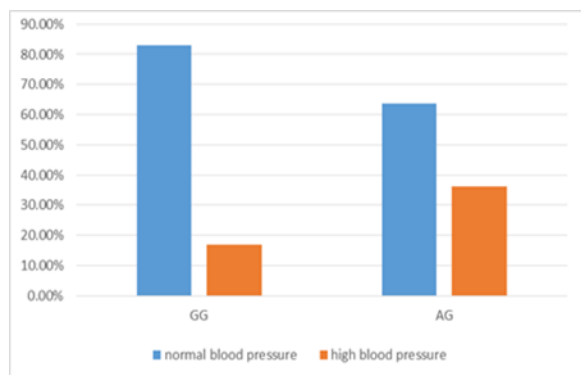
mass index (BMI), blood pressure and blood samples have been taken on periodic health examination. Genetic polymorphism were analysed by methodes that are based on chain reaction of -PCR polymerization which "imitates" DNA replication in the in vitro conditions. Conditions of the PCR reaction are taken from literature. Restriction digestion was done with NaoI enzyme [4]. Samples were, after that, analysed by electrophoresis on 10% polyacrylamide gel.



Picture 1. TNFA-308 genotyping after incubation with NaoI enzyme and electrophoresis

RESULTS

Results of the study implemented on 109 workers have shown that GG genotype was found in 59.63% volunteers while AG genotype was presented in 40.37% (genetic analysis did not succeed in two examinees). Analysis that has included BMI and blood pressure, has not shown any important connection between obesity and TNFA-308 genotype. However, 36.36% volunteers with TNFA-308 AG genotype had higher blood pressure ($p=0.021$), which is 2.8 times more often compared to GG genotype. It is also proven that length of service was another unfavorable factor, while smoking and alcohol consumption did not show significant connection. Moreover, 44.44% workers working for more than 20 years in specific environment had higher blood pressure.



Picture 2. Connection between genotype and blood pressure

CONCLUSION

Results of this study have shown that engagement in harmful working environment, as well as TNF-308 AG genotype increase the risk for higher blood pressure. Because of that, people with this genotype, especially the ones working in harmful conditions for a longer period, require more frequent medical surveillance and application of the proposed preventive measures so as to avoid cardio-vascular problems.

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